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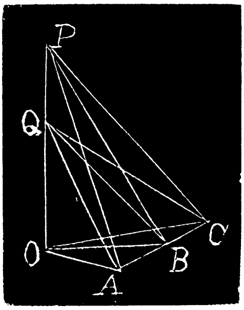
$\angle OAP=45^\circ=\beta$, $\angle OAQ=40^\circ=\delta$, $\angle OBP=42^\circ=\gamma$, $\angle OBQ=38^\circ=\mu$, $\angle OCP=40^\circ=\lambda$, $\angle OCQ=36^\circ=\nu$.



$OA=m$, $OB=n$, $OC=p$, $\angle OCA=\theta$.

$\therefore\ m=y\cot\delta=x\cot\beta$, $n=y\cot\mu=x\cot\gamma$.

$p=y\cot\nu=x\cot\lambda$.

Also from triangles OCA and OCB,

$$m^2=p^2+(a+b)^2-2p(a+b)\cos\theta\ \ldots\ldots\ldots\ldots(1).$$

$$n^2=p^2+b^2-2pb\cos\theta\ \ldots\ldots\ldots\ldots(2).$$

The values of m, n, p in (1) and (2) and eliminating $\cos\theta$, we get

$$x=\sqrt{\frac{ab(a+b)}{b\cot^2\beta+a\cot^2\lambda-(a+b)\cot^2\gamma}}\qquad y=\sqrt{\frac{ab(a+b)}{b\cot^2\delta+a\cot^2\nu-(a+b)\cot^2\mu}}$$

Substituting we get $y=1505.183$ feet, $x=4232.505$ feet.

Also solved by ***ALOIS F. KAVORIK***, and ***CHAS. C. CROSS.***

CALCULUS.

71. Proposed by J. C. CORBIN, Pine Bluff, Ark.

Form the differential equation of the third order, of which $y=c_1e^{2x}+c_2e^{-3x}+c_3e^x$ is the complete primitive.

III. Solution by C. HORNUNG, A. M., Professor of Mathematics, Heidelberg University, Tiffin, O.; COOPER D. SCHMITT, A. M., Professor of Mathematics, University of Tennessee, Knoxville, Tenn.; C. W. M. BLACK, A.M., Professor of Mathematics, Wesleyan Academy, Wilbraham, Mass.; G. B. M. ZERR, A. M., Ph. D., The Russell College, Lebanon, Va.; and the PROPOSER.

$y=c_1e^{2x}+c_2e^{-3x}+c_3e^x\ \ldots\ldots(1)$, $dy/dx=2c_1e^{2x}-3c_2e^{-3x}+c_3e^x\ldots\ldots\ldots(2)$;

$d^2y/dx^2=4c_1e^{2x}+9c_2e^{-3x}+c_3e^x\ldots\ldots(3)$. $d^3y/dx^3=8c_1e^{2x}-27c_2e^{-3x}+c_3e^x\ldots\ldots(4)$.

(2)−(1) gives $dy/dx-y=c_1e^{2x}-4c_2e^{-3x}\ \ldots\ldots\ldots\ldots(5)$,

(4)−(1) gives $d^3y/dx^3-y=7c_1e^{2x}-28c_2e^{-3x}\ \ldots\ldots\ldots\ldots(6)$,

(6)−7(5) gives $d^3y/dx^3-7(dy/dx)+6y=0$.

IV. Solution by J. SCHEFFER, A. M., Hagerstown, Md.

The equation reduces itself to what is the equation the three roots of which are 1, 2, −3. This equation is $z^2-7z+6=0$; consequently the complete primitive is $d^3y/dx^3-7(dy/dx)+6y=0$.

72. Proposed by G. B. M. ZERR, A. M., Ph. D., President and Professor of Mathematics, The Russell College, Lebanon, Va.

A man has a park in the form of a parabolic segment cut off by a chord making an angle $\frac{1}{4}\pi$ with the axis. Within the park is a right angled triangular flower plat with one vertex at the center of gravity of the segment, the other vertex at the lower extremity of the chord, and the right angle on the diameter bisecting the chord. The park contains 30